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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/235,319	01/22/1999	RICHARD M. UBOWSKI	IYENGAR8-10	4856

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FARKAS AND MANELLI
2000 M STREET NW
7TH FLOOR
WASHINGTON, DC 200363307

EXAMINER

TRAN, CON P

ART UNIT	PAPER NUMBER
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2644

DATE MAILED: 12/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/235,319

Applicant(s)

UBOWSKI ET AL.

Examiner

Con P. Tran

Art Unit

2644

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 September 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 1-3,8,9,14, and 22** are rejected under 35 USC 102(b) as anticipated by Park (5,502,217).

Park shows (Fig 3) a single echo canceller which is reconfigurable to serve as a hybrid or an acoustic echo canceller(col. 3, lines 50-61). In Figure 4, it is shown that the sampler 400 is switchable to sample either the transmit path (for hybrid echo cancellation) or the receive path (for acoustic echo cancellation). The switching or switched state of 400 inherently constitutes a "register" which stores the current switching state. It is also true that if sampler 400's signal source is switchable, which it is, then there would inherently be a means to control the switching state. Whether or not this is a manual switch, a digital latch controlled via a microprocessor, etc., is not disclosed, but nonetheless some such means must be present. Such means which controls the switching state of 400 is itself inherently a register.

Since the switching state of 400, and the inherent control register thereof (be that the state of 400 itself, a manual switch which controls the state of 400, or some other switched-state controlling means as discussed above) determines whether or not the echo canceller is used as a hybrid or acoustic echo canceller, and thus configures the echo canceller per se as one of a hybrid or acoustic echo canceller.

It is clear from Park that whichever path is chosen as a signal source for 400, the echo span is determined (Figs 4 and 5) and sent to the echo canceller to control it in a suitable manner to cancel the echo.

The echo canceller per se is shown as a block 301, generally connected between the transmit and receive lines.

The details of this are not shown, since the entire disclosure focusses on being able to do either hybrid or acoustic echo cancellation, it must be deemed that 301's input and output paths are configured appropriately in conjunction with the switching state of 400. This is what is suggested to one of ordinary skill, since the device would not be operable (or make sense) if, for example, the sampler 400 were detecting transmit path to measure the hybrid echo, but the actual echo canceller were switched or wired in the acoustic echo cancelling configuration.

Claims 1-3 are thus met in view of the above discussion. **Claim 8** is also met since the switching state of sampler 400 determines whether a hybrid or acoustic echo path is analyzed, and, as discussed above, the delay value or span is passed to the echo canceller, which one of ordinary skill would understand to mean that it is configured in conjunction with the chosen hybrid or acoustic echo cancellation task.

Thus one of two modes, hybrid or acoustic, is chosen by the state of "register" 400 or its inherently-present state-control means, be that manual switch or electronic register such as a latch. **Claim 9** is clearly met since the device is clearly reconfigurable for use in hybrid or acoustic echo cancellation. **Claim 14** is met since Figure 3 of Park shows a microphone and a telephone line. The microphone output goes out on the transmit path, and thus would be selected by 400 in one mode, and the receive path is the telephone line, which would be selected by 400 in the other mode.

Claim 22 is met since the device of Park is clearly "for reconfiguring".

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 6,7,15,16,18, and 19** are rejected under 35 USC 103(a) as obvious over Park considered with Iyengar (5,663,955).

Park's capabilities have been discussed above. Iyengar uses two separate echo cancelling filters, but he only adapts coefficients of one at a time. This is because no

adaptation is permitted during double talk, and the other two states are simply far end talk or near end talk.

During near end talk, hybrid echo cancellation is needed since there is no acoustic echo at the near end which originates from the far end, but the near end speech is transmitted to the far end via the hybrid. During far end talk, acoustic echo cancellation is needed, but no net signal should be going into the hybrid since there is no near end speech, and the far end echo is cancelled by the acoustic echo canceller.

As a result, it would have been obvious to operate Park's echo canceller in the acoustic cancellation mode during far end talk (Fig 3 shows the acoustic echo path) and in the hybrid echo cancellation mode during near end speech.

Iyengar teaches the detection of the transmit or receive state, and setting the appropriate adaptation mode, as well as a common memory which stores coefficients of whichever mode is being adapted. It would have been obvious to one of ordinary skill at the time of filing implement a transmit/receive state detector and necessary memory and software in Park to thus implement the correct echo cancellation during either one of the transmit state, for the purpose of having an echo canceller which takes care of the predominant echo in both states using only one echo canceller which is effectively time shared.

Thus the language of **claim 15**, "reconfiguring" is met. **Claim 16** is met since the span length is determined by Park and used to change the span of the echo canceller itself.

If, on the other hand, the system of Park, which appears to consist essentially of blocks 301 and 302 of Figure 3, were not constructed to be automatically used for transmit and receive modes in the operable sense (rapidly switching modes in step with the conversation), then it would simply have been obvious to switch it manually, and leave it in one or the other mode as desired. This certainly would have been suboptimal, which suggests that one of ordinary skill would have been motivated to set the system up to automatically reconfigure as the conversation mode switches from transmit to receive.

Regarding **claim 6**, as noted, during double talk, Iyengar indicates that adaptation should stop, otherwise divergence may occur. Thus it would have been obvious in the overall system of Park to stop tap update during double talk, and to restart tap update when double talk ceases, thus constituting an operable reconfiguration. This would have been another aspect of the overall or total needed control of a system (such as Park) which uses LMS adaptive filters to control echo. The entire control state of various such parameters as were known in adaptive echo cancellers, such as update-taps-or-not, transmit/receive mode, value of μ (see rejections *infra*), etc. would inherently have collectively constituted a "register".

Claims 18 and 19 are also met in view of the discussions above regarding tap update inhibition and echo canceller mode.

5. **Claims 12 and 13** are rejected under 35 USC 103(a) as obvious over Park considered with Velardo (5,587,998) and Danstrom (4,582,963).

Park does not specifically describe his echo canceller per se (i.e., the part with an FIR and an adaptive tap weight update algorithm and any pre- or post- processing). Thus one of ordinary skill would have been motivated to seek more detailed embodiments in order to supply an actual working echo canceller for Park. Such embodiments would have been any known echo canceller, such as those of Danstrom or Velardo. It would have been obvious to use either one of Danstrom or Velardo's teachings for the purpose of supplying a "working", or perhaps a more advanced echo canceller for Park, Iyengar.

Danstrom is a typical full-band echo canceller, whereas Velardo is clearly a subband-based echo canceller.

It would have been obvious, in fact, to supply various possible known features in any echo canceller, and to switchably select any one, or any known combination of features, for use at any time. See Duplan Corp. v. Deering Millikan, 197 USPQ 342 (see #94).

Thus in some situations, subband echo cancellation may be more suitable than full band, and thus it would have been obvious to arrange to alternately switch between the two configurations for the purpose of using the most suitable technology at any time.

Thus it would have been obvious using any known means to arrange in block 301 of Park to alternately switch between various known configurations, which would have included full band or subband cancellation; this principle would also have applied to other known features of echo cancellers, such as values for μ , the span length, etc.

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Claims 12 and 13 are thus met. Such a switching arrangement, even were it merely manual, would have met the language “operably reconfigurable” of **claim 13**.

6. **Claims 21** is rejected under 35 USC 103(a) as obvious over Park considered with Iyengar (5,663,955), further considered with Velardo (5,587,998) and Danstrom (4,582,963).

Park of the Park, Iyengar combination does not specifically describe his echo canceller per se (i.e., the part with an FIR and an adaptive tap weight update algorithm and any pre- or post- processing). Thus one of ordinary skill would have been motivated to seek more detailed embodiments in order to supply an actual working echo canceller for the Park, Iyengar combination. Such embodiments would have been any known echo canceller, such as those of Danstrom or Velardo. It would have been obvious to use either one of Danstrom or Velardo’s teachings for the purpose of supplying a “working”, or perhaps a more advanced echo canceller for Park, Iyengar.

Danstrom is a typical full-band echo canceller, whereas Velardo is clearly a subband-based echo canceller.

It would have been obvious, in fact, to supply various possible known features in any echo canceller, and to switchably select any one, or any known combination of features, for use at any time. See Duplan Corp. v. Deering Millikan, 197 USPQ 342 (see #94).

Thus in some situations, subband echo cancellation may be more suitable than full band, and thus it would have been obvious to arrange to alternately switch between the two configurations for the purpose of using the most suitable technology at any time.

Thus it would have been obvious using any known means to arrange in block 301 of Park to alternately switch between various known configurations, which would have included full band or subband cancellation; this principle would also have applied to other known features of echo cancellers, such as values for μ , the span length, etc. **Claim 21** is thus met. Such a switching arrangement, even were it merely manual, would have met the language "operably reconfigurable" of claim 13.

7. **Claims 10 and 11** are rejected under 35 USC 103(a) as obvious over Park considered with Velardo (5,587,998) and Sih (5,687,229).

These claims refer to the features of using center clipping either in full band or subband echo cancelling.

Sih teaches the known use of full band center clipping (114 of Figure 1, and his improved version with comfort noise, 164 of Fig 5), while Velardo teaches the use of subband center clipping (Fig 4, etc.)

Use of any of these in the echo canceller 300 of Park, in a switchable manner, be it manual or electronically controlled via microprocessor or pipeline processor (i.e., the several methods known to those of ordinary skill in the art) would have been obvious, for the purpose of making the unit suitable for many situations, as well as under the doctrine in *Duplan Corp. v. Deering Millikan*, 197 USPQ 342 (mentioned supra).

8. **Claim 20** is rejected under 35 USC 103(a) as obvious over Park considered Iyengar (5,663,955), further considered with Velardo (5,587,998) and Sih (5,687,229).

These claims refer to the features of using center clipping either in full band or subband echo cancelling.

Sih teaches the known use of full band center clipping (114 of Figure 1, and his improved version with comfort noise, 164 of Fig 5), while Velardo teaches the use of subband center clipping (Fig 4, etc.)

Use of any of these in the echo canceller 300 of Park, in a switchable manner, be it manual or electronically controlled via microprocessor or pipeline processor (i.e., the several methods known to those of ordinary skill in the art) would have been obvious, for the purpose of making the unit suitable for many situations, as well as under the doctrine in Duplan Corp. v. Deering Millikan, 197 USPQ 342 (mentioned supra).

9. **Claims 4 and 5** are rejected under 35 USC 103(a) as obvious over Park considered with Sih (5,687,229).

Sih teaches the use of variable step (μ) size, for purposes of controlling adaptation speed and stability, according to a state determined by the usual considerations, such as near end speech, far end speech, etc. Column 15, lines 43 + describe the general situation in which the LMS adaptive filter is given $\mu=1$ initially and this value is adjusted downward as ERLE rises; this leads to reasonably rapid convergence and a lower steady-state error at convergence. It would have been

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obvious in Park to implement this known method of achieving these desirable goals—otherwise, the filter convergence speed and steady state error would have been suboptimal in regard to the known standards in the art. Thus the control register state would also include the current value of μ , which would change periodically, such as when switching from hybrid to acoustic cancellation mode and vice versa, as well as during convergence in either one of those modes.

10. **Claim 17** is rejected under 35 USC 103(a) as obvious over Park considered with Iyengar (5,663,955), further considered with Sih (5,687,229).

Sih teaches the use of variable step (μ) size, for purposes of controlling adaptation speed and stability, according to a state determined by the usual considerations, such as near end speech, far end speech, etc. Column 15, lines 43 + describe the general situation in which the LMS adaptive filter is given $\mu=1$ initially and this value is adjusted downward as ERLE rises; this leads to reasonably rapid convergence and a lower steady-state error at convergence. It would have been obvious in Park to implement this known method of achieving these desirable goals—otherwise, the filter convergence speed and steady state error would have been suboptimal in regard to the known standards in the art. Thus the control register state would also include the current value of μ , which would change periodically, such as when switching from hybrid to acoustic cancellation mode and vice versa, as well as during convergence in either one of those modes.

Response to Arguments

11. Applicant's arguments with respect to claims 1-22 have been considered but are moot in view of the new grounds of rejection.

Conclusion

12. The following are suggested formats for either a Certificate of Mailing or Certificate of Transmission under 37 CFR 1.8(a). The certification may be included with all correspondence concerning this application or proceeding to establish a date of mailing or transmission under 37 CFR 1.8(a). Proper use of this procedure will result in such communication being considered as timely if the established date is within the required period for reply. The Certificate should be signed by the individual actually depositing or transmitting the correspondence or by an individual who, upon information and belief, expects the correspondence to be mailed or transmitted in the normal course of business by another no later than the date indicated.

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Please refer to 37 CFR 1.6(d) and 1.8(a)(2) for filing limitations concerning facsimile transmissions and mailing, respectively.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Con P. Tran, whose telephone number is (703) 305-2341. The examiner can normally be reached on M - F (8:30 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W. Isen can be reached on (703) 305-4386. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Customer Service Office at telephone number (703) 306-0377.

cpt CPT
November 30, 2002


FORESTER W. ISEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600